MANTISPIDÆ PARASITIC ON SPIDER EGG SACS

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Incidental to observations on insect parasites of spiders the following is thought worthy of note. There emerged from the egg sac of the funnel web weaver, *Agelena naevia* Walckenaer, a female specimen of *Mantispa fusicornis* Banks.[1] This species was first described in 1911 from Florida, though there are specimens in the collection of the Museum of Comparative Zoology which have been taken from as far north as Virginia. It has not, to my knowledge, been again recorded in the literature and little is known about its distribution or habits.

Figures 1 and 2 illustrate the external characters of the specimen, a description of which is given herewith. Length over all to tip of wings behind, about 22 mm. Head about 2.5 mm. wide, brown marked with black. A median longitudinal black line on clypeus and labrum. Antennæ 3.2 mm. long, separated at base by a distance about equal to length of scape; the latter light, the pedicel brown, and the 28 more or less similar segments of the flagellum black. Maxillæ reddish with long 5-segmented palpus. Labial palpus short, 3-segmented.

Prothorax tubular, 4.3 mm. long, transversely wrinkled, expanded cephalad, and rebordered along anterior edge. Mostly grayish brown, darker on expanded portion in front of the pair of pronotal tubercles. Extending back along the mid-dorsum is a thin, black stripe widening somewhat in front of the mesothorax, and a less conspicuous black stripe lies ventrolaterad on each side.

Pterothorax mostly black, with a pair of yellow bands on the mesoprescutum and mesoscutum, and a less distinct pair on the metascutum, these diverging posteriad and joining the yellow bases of fore and hind wings. The pleural areas with distinct an- and katepisterna, but a distinct suture demarcating the an- and

[1] Identified with the aid of Professor Nathan Banks of the Museum of Comparative Zoology.

katepimeron present only on the metathorax. The location of this suture on the mesothorax is marked by a ridge. Abdomen black with splashes of reddish brown.

Prothoracic leg raptorial, the coxa 4.5 mm. long, yellowish gray, with a suggestion of a division in the proximal third. Femur dark brown, enlarged, with a spur equal in length to the width of the segment at that point arising from the medial surface, and with many short teeth extending to the distal end. Tibia and tarsus dark brown, the latter 5-segmented, and ending in a single smooth claw. Meso- and metathoracic legs ambulatorial, similar in appearance and in size, except that the tibia of the latter is almost $1\frac{1}{2}$ times the length of that of the former. Coxæ brown, other segments yellowish gray, tip of tarsus black and ending in a pair of 5-toothed claws and a broad pulvillus. Third tibia lacking the "sillon longitudinal," or *linea impressa,* of Navás (1925).[2]

Fore wing 17 mm., and hind wing 14 mm. long, clear except for reddish brown pterostigma. Venation of right wings as indicated in figure 2, but left wings differing from these in a number of details. In the fore wing the most important difference is the absence of a cross-vein between the 1st and 2nd cells R_1 so that there is one long and one ordinary cell, instead of three cells. In the hind wing a cross-vein is present dividing into two the very long cell (R?) proximad of the 1st cell R_1. These and other types of variations have been fully discussed by Kuwayama (1925). This author pointed out the need for caution in diagnosing genera on the basis of wing venation, which is apparently quite variable in the Mantispidæ.

The spider was among those collected by Mr. R. B. Brown near Albion, Mich., on Sept., 17, 1936 and taken to New Haven, Conn., the next day, to be later used in some morphology studies at Yale University. The spider was confined in a cylindrical glass container with a cover, which, however, to allow the passage of air was raised slightly by inserting a piece of string between it and the container. The spider laid its eggs on about Sept., 20 and was killed for study a few days afterward. No spiderlings had yet emerged on October 15, and the egg sac was not looked at again

[2] This character is probably not present in the Mantispidæ. At least it was not present on specimens of *Mantispa interrupta* Say, *M.* (*Climaciella*) *brunnea* Say, and *M. viridis* Banks which I had an opportunity to examine.

until November 8 when the parasite was found lying dead on the bottom of the container. The white egg sac was seen to have within it a greenish yellow, oval cocoon (Fig. 3). This cocoon was made of loosely woven threads and was 8.4 mm. long by 6.9 mm. wide. Both egg sac and cocoon were perforated by a more or less circular hole 3.3 mm. in diameter through which the parasite had emerged. Also in the container, but outside of the cocoon, were the exuviæ of the pupa or nymph. Only the occipital and pronotal regions were split, indicating the site of emergence of the imago. The wing pads extended back to about the fourth abdominal segment. It is interesting to note that in the pupa the prothorax and prothoracic coxæ are not elongate as in the imago, but hardly longer than the corresponding structures on the pterothorax (Fig. 4). Moreover, the trochanter is hardly apparent, while a proximal, patella-like division of the tibia is very conspicuous. Brauer (1855), in describing the pupa of *Mantispa pagana* Fabr., had called attention to the fact that the prothorax is only half the length of that in the imago, but the reader is given to understand that the prothoracic legs are the same as in the imago. Unfortunately, in his figures these legs are not clearly discernible.

Discussion. The circumstances surrounding the development of this parasite seem very peculiar, especially when viewed in the light of the classical investigations of Brauer (1869) on the European species, *Mantispa styriaca* Poda. For many years his was the only case known, and all the standard entomology texts give Brauer's account of the life history as typical for the group. Two points are emphasized in his account: first, the sacs of only certain species of Lycosidæ[3] are attacked, and second, the young campodeiform larvae, despite the fact that they can move about actively, do not feed or enter the spider egg sacs until after a period of eight months hibernation. However, Brauer himself had found a *Mantispa* larva in the lenticular sac of a *Thomisus* (crab spider), and he also referred to Rogenhofer's rearing a specimen from the

[3] *Sensu latiore.* Brauer lists the following as favorable material for rearing the *Mantispa: Lycosa inquilina, Arctosa allodroma* (= *cinerea*), and *Dolomedes* (the latter belonging to the Pisauridæ). All of these have white spherical egg sacs. He states definitely that the lenticular green egg sacs of *Lycosa fluviatilis* (= *Pardosa agricola*) are not attacked.

egg sac of a *Clubiona,* though he thought these were exceptions. Moreover, Poujade (1898) gives *Drassodes hypocrita* Simon as the host of *M. stryriaca,* and six of the same species were also reared from drassid egg sacs by Main (1931). It seems probable therefore that this species is polyphagous.

For American species notes on the eggs, young larvæ, and habits are given by Smith (1934) for *interrupta, sayi,* and *brunnea;* by Hungerford (1936) for *interrupta;* and by Hoffmann (1936) for *brunnea* var. *occidentalis.* To date none of these larvæ have been successfully reared to maturity, but Smith records the emergence of a pupa of *interrupta* from the egg sac of the jumping spider, *Dendryphantes militaris.* Dr. G. W. Barber, of the New Haven laboratory of the U. S. D. A. Bureau of Entomology and Plant Quarantine, informs me that he has observed a female of *interrupta* ovipositing on a leaf, so that it is entirely possible that this species may also be parasitic on other attids, clubionids, and thomisids, etc., which attach their egg sacs to leaves.

It is evident that in the case of *M. fusicornis* the larva did not hibernate. It is still a question as to where it came from, and there are two possibilities. It either crawled through the narrow slit into the spider's container at New Haven, or was carried from Michigan hidden among the hairs on the spider's body, only to leave it for the egg sac after the latter was made. Even if the larva entered the egg sac on the same day it was made, less than 48 days were needed to complete its development to the imago, (assuming that the adult stage was attained the day before it was found dead). In Brauer's case the larvæ did not pupate until 50 days after entering the egg sac, and the adult stage was not attained until over four weeks later.

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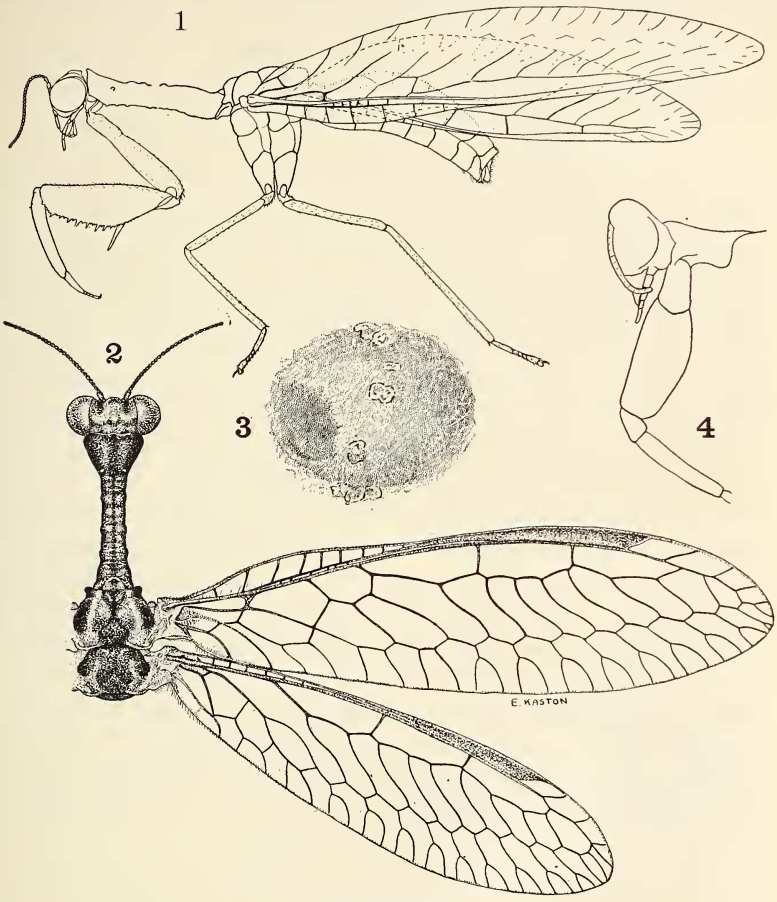
PLATE XII

Figure 1. Lateral aspect of *Mantispa fusicornis* ♀ ; wings in normal position.
Figure 2. Dorsal aspect of head, thorax, and right wings.
Figure 3. Cocoon from which pupa emerged. A few empty egg shells of the spider are adhering to the surface.
Figure 4. Lateral aspect of the pupal head, prothorax, and part of prothoracic leg.



MANTISPA